In the Claims:

1. (Currently amended) An interferometer sensor comprising:

a two-dimensional sensor head comprising a polymer film of substantially uniform thickness disposed over a substrate;

an interrogation signal source for providing an interrogating signal to the sensor head, the interrogation signal extending across the area of the sensor head and being incident normally to the sensor head, the sensor head providing an optical output signal over the area of the sensor head in dependence on incident signals detected by the sensor; and

an optical sensing device arranged to receive the optical output signal from the sensor head at a location remote from the sensor head[[.]];

further comprising an optical excitations source arranged to transmit optical excitation pulses through the sensor head into the sample.

2. (Original) An interferometer according to claim 1, in which the optical sensing device comprises a two-dimensional photodetector array.

3. (Original) An interferometer according to claim 1, in which the optical sensing device comprises a photodiode arranged to scan the output from the sensor head across its area.

4. (Previously Presented) An interferometer as claimed in any claim 1, wherein the polymer film has a thickness greater than 5μm.

5. (Original) An interferometer as claimed in claim 4, in which the polymer sensing film has a thickness in the range 30μm to 60μm.

6. (Previously Presented) An interferometer as claimed in claim 1, wherein the polymer film has a Young's modulus less than 15 GPa.

7. (Previously Presented) An interferometer as claimed in claim 1, wherein the polymer film comprises a single layer polymer structure deposited directly onto the substrate.

8. (Previously Presented) An interferometer as claimed in claim 1, wherein the interrogation signal source comprises a continuous wave interrogating laser source.

9. (Cancelled.)

10. (Original) An interferometer according to claim 9, in which the excitation source comprises a laser light source arranged to provide excitation pulses to the sensor head.

11. (Previously Presented) An interferometer as claimed in claim 1, further comprising an optical expanding beam arrangement disposed between the sensor head and the optical sensing device.

12. (Previously Presented) An interferometer as claimed in claim 1, further comprising an optically diverging lens arrangement disposed between the interrogation signal source and the sensor head, for altering the degree of collimation of the interrogation signal provided to the sensor head.

13. (Previously Presented) An interferometer as claimed in claim 1, further comprising means for measuring the surface temperature at the sensor head.

14. (Previously Presented) An interferometer as claimed in claim 1, further comprising an optical arrangement for altering the angle of incidence of the interrogation signal on the sensor head.

15. (Original) An interferometer as claimed in claim 14, wherein different angles of incidence are selected for different locations of the sensor head.

16. (Withdrawn) A method of manufacturing an interferometer according to claim 1, comprising the step of, on a transparent substrate, forming a polymer sensing film by spin coating a liquid polymer on the substrate.

17. (Withdrawn) A method of manufacturing an interferometer according to claim 1, comprising the steps of;

thermally evaporating a polymer onto the surface of a transparent substrate;

condensing the polymer into a liquid phase; and

curing the liquid phase polymer using a radiation source thereby forming a solid polymer film on the substrate.

18. (Withdrawn) A method according to claim 17, in which the radiation source comprises an ultra-violet radiation source.

19. (Withdrawn) A method according to claim 17, in which the radiation source comprises an electron beam.